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File: USPT

Jun 2, 1998

US-PAT-NO: 5760526
DOCUMENT-IDENTIFIER: US 5760526 A

TITLE: Plastic encapsulated SAW device

DATE-ISSUED: June 2, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Anderson; Michael John	Phoenix	AZ	N/A	N/A

US-CL-CURRENT: 310/313R; 310/340

CLAIMS:

I claim:

1. A plastic encapsulated surface acoustic wave (SAW) device, comprising:
a surface acoustic wave (SAW) die having a broad face containing an active region having an outer perimeter;
a die flag having a surface in juxtaposition to and facing toward said broad face, wherein a central portion of said die flag has been coined to provide a relief space between said surface of said die flag and said broad face of said SAW die;
an annular sealing ring joining said broad face and said surface of said die flag and leaving a void disposed over said active region, wherein said annular sealing ring has an inner perimeter larger than said outer perimeter of said active region;
a plastic encapsulant around said SAW die and said die flag outside said void; and
external electrical contacts protruding from said SAW device and coupled to corresponding contacts on said broad face of said SAW die.
2. A device as claimed in claim 1, wherein there is provided an annular ridge protruding above said die flag and facing toward said broad face of said SAW die such that an inner perimeter of said annular ridge lies outside said outer perimeter of said active region.
3. A device as claimed in claim 2, wherein said annular sealing ring lies outside an exterior perimeter of said annular ridge.
4. A device as claimed in claim 1, where there is further provided on said broad face of said SAW die, an annular dielectric region insulating electric leads extending from contact regions near a periphery of said SAW die to within said active region, said annular dielectric region insulating said electric leads from an overlying annular electrically conductive solder region.
5. A surface acoustic wave (SAW) device, comprising:
a surface acoustic wave (SAW) die having a broad face containing an active region having an outer perimeter and electrical contacts lying outside said active region;
a die mounting region having a surface in juxtaposition to and facing toward said broad face, wherein a central portion of said die mounting region has been coined to provide a relief space between said surface of said die mounting region and said broad face of said SAW die;
an annular sealing ring comprising a heat softenable sealing material, said annular sealing ring joining together said broad face and said surface of said die mounting region leaving a void therebetween over said active region, wherein said annular sealing ring has an inner perimeter larger than said outer perimeter of said active region; and

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L13: Entry 1 of 2

File: USPT

Nov 3, 1998

US-PAT-NO: 5831369
DOCUMENT-IDENTIFIER: US 5831369 A

TITLE: Encapsulation for electronic components and method for producing the encapsulation

DATE-ISSUED: November 3, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Furbacher; Bruno	Ingolstadt	N/A	N/A	DEX
Lupp; Friedrich	Munchen	N/A	N/A	DEX
Pahl; Wolfgang	Munchen	N/A	N/A	DEX
Trausch; Gunter	Munchen	N/A	N/A	DEX

US-CL-CURRENT: 310/313R; 310/340

CLAIMS:

We claim:

1. In a component operating with surface acoustic waves (SAW component) and having a substrate and component structures on the substrate, an encapsulation for the component, comprising:
a cap sealing the component structures on the substrate, said cap being formed by a cover on the substrate and said cover having cutouts formed therein in regions of the component structures for accommodating the component structures;
said cover having an upright carrier surrounding the component structures on the substrate and a covering layer applied onto said carrier, said cover also including supports disposed on the substrate; and
said carrier formed of a photoresist material.
2. The encapsulation according to claim 1, wherein said cover is an integral element containing said cutouts.
3. The encapsulation according to claim 1, wherein said supports, said carrier and said covering layer of said cover consisting of a photoresist material.
4. The encapsulation according to claim 1, wherein said cover is laminated onto the substrate.
5. The encapsulation according to claim 1, wherein said carrier is a closed frame.
6. The encapsulation according to claim 1, wherein said covering layer is formed of a glass material.
7. The encapsulation according to claim 1, wherein said covering layer is formed of a glass ceramic.
8. The encapsulation according to claim 1, wherein said covering layer is formed of a material to be structured by a photographic technique.
9. The encapsulation according to claim 1, wherein said cover exposes electrical connections on the substrate.
10. The encapsulation according to claim 1, wherein said cover has openings formed therein for introduction of an acoustic damping compound.
11. The encapsulation according to claim 1, including a plastic sheath disposed over said cover.
12. The encapsulation according to claim 11, wherein said sheath is formed of a plastic film.

external electrical leads coupled to electrical contacts on said broad face of said SAW die by a heat softenable conductor, wherein said heat softenable sealing material and said heat softenable conductor are softened substantially simultaneously to join, respectively, said SAW die to said die mounting region and said electrical contacts to said external electrical leads.

6. A SAW device manufactured by a method comprising steps of:

providing a surface acoustic wave (SAW) die having a broad face containing an active region having an outer perimeter and having electrical contacts lying outside said outer perimeter of said active region;

providing a lead frame having a die flag and multiple electrode fingers extending toward said die flag, said die flag having a surface in juxtaposition to and facing toward said broad face, wherein a central portion of said die flag has been coined to provide a relief space between said surface of said die flag and said broad face of said SAW die;

providing an annular sealing ring on either or both of said die flag and said broad face, wherein said annular sealing ring has an inner perimeter larger than said outer perimeter of said active region;

positioning said SAW die in juxtaposition to said lead frame so that said die flag faces said active region and said multiple electrode fingers face said electrical contacts; and

heating said SAW die and lead frame to, substantially simultaneously, (i) electrically connect said electrical contacts to said multiple electrode fingers, and (ii) join said broad face and said die flag by said annular sealing ring, leaving a void above said active region.